

## PATENT COOPERATION TREATY

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PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE  
 in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 26 January 2001 (26.01.01)	
<b>International application No.</b> PCT/GB00/02249	<b>Applicant's or agent's file reference</b> PAT 99008*PC
<b>International filing date (day/month/year)</b> 09 June 2000 (09.06.00)	<b>Priority date (day/month/year)</b> 10 June 1999 (10.06.99)
<b>Applicant</b> JOHNSON, Terence, Philip et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
 09 December 2000 (09.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
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PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE

(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

JONES, Kendra  
Nokia IPR Department  
Nokia House  
Summit Avenue  
Farnborough, Hampshire GU14 0NG  
ROYAUME-UNI

Date of mailing (day/month/year) 09 March 2001 (09.03.01)	
Applicant's or agent's file reference PAT 99008*PC	IMPORTANT NOTIFICATION
International application No. PCT/GB00/02249	International filing date (day/month/year) 09 June 2000 (09.06.00)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

JEFFERY, Kendra  
Nokia IPR Department  
Nokia House  
Summit Avenue  
Farnborough, Hampshire GU14 0NG  
United Kingdom

State of Nationality

State of Residence

Telephone No.

01252 865000

Facsimile No.

01252 865080

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

JONES, Kendra  
Nokia IPR Department  
Nokia House  
Summit Avenue  
Farnborough, Hampshire GU14 0NG  
United Kingdom

State of Nationality

State of Residence

Telephone No.

01252 865000

Facsimile No.

01252 865080

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned  
☐ the International Searching Authority ☒ the elected Offices concerned  
☒ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

R. Chrem

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>PAT 99008*PC</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/ 02249</b>	International filing date (day/month/year) <b>09/06/2000</b>	(Earliest) Priority Date (day/month/year) <b>10/06/1999</b>
Applicant <b>NOKIA MOBILE PHONES LIMITED</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2

☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02249

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G02F1/13 H04M1/02 G06F3/147

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 841 431 A (SIMMERS CHARLES RUSSELL) 24 November 1998 (1998-11-24) column 4, line 40 - line 51; figure 2 ---	1,6-8, 11-14
Y	US 5 897 188 A (FUJITA MASARU ET AL) 27 April 1999 (1999-04-27) column 18, line 21 - line 50; figure 26 column 20, line 58 - column 21, line 32; figure 31 ---	1,6-8, 11-14
A	EP 0 369 188 A (TEXAS INSTRUMENTS INC) 23 May 1990 (1990-05-23) column 11, line 36 - line 58; figure 6 ---	1,12
A	EP 0 529 933 A (MOTOROLA INC) 3 March 1993 (1993-03-03) column 4, line 24 - line 34; figure 4 --- -/--	1,12

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

18 August 2000

Date of mailing of the international search report

28/08/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Diot, P

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 00/02249

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 654 730 A (TANAKA KAZUO) 5 August 1997 (1997-08-05) column 4, line 18 -column 6, line 43; figure 1 ---	1-4, 11
A	EP 0 567 209 A (SHARP KK) 27 October 1993 (1993-10-27) column 4, line 43 -column 7, line 55; figure 9 ---	1-8
A	US 4 836 651 A (ANDERSON RICHARD A) 6 June 1989 (1989-06-06) column 1, line 20 -column 2, line 03; figure 1 ---	2
A	EP 0 443 527 A (CASIO COMPUTER CO LTD) 28 August 1991 (1991-08-28) column 4, line 10 -column 5, line 47; figure 3 ---	1,6,7
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 215 (P-874), 19 May 1989 (1989-05-19) & JP 01 032231 A (SEIKO EPSON CORP), 2 February 1989 (1989-02-02) abstract ---	1-8
A	US 4 655 551 A (WASHIZUKA ISAMU ET AL) 7 April 1987 (1987-04-07) column 2, line 603 -column 3, line 48; figures 1,10 -----	1-7

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02249

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5841431	A	24-11-1998	AU 3913497 A CN 1246194 A EP 1019896 A WO 9821709 A	03-06-1998 01-03-2000 19-07-2000 22-05-1998
US 5897188	A	27-04-1999	JP 5257142 A US 5680183 A US 5432626 A	08-10-1993 21-10-1997 11-07-1995
EP 0369188	A	23-05-1990	DE 68925271 D DE 68925271 T JP 2257731 A US 5309351 A	08-02-1996 14-08-1996 18-10-1990 03-05-1994
EP 0529933	A	03-03-1993	DE 69225446 D DE 69225446 T HK 1008156 A JP 5232902 A SG 46436 A	18-06-1998 03-12-1998 30-04-1999 10-09-1993 20-02-1998
US 5654730	A	05-08-1997	US 5841414 A	24-11-1998
EP 0567209	A	27-10-1993	JP 2870621 B JP 5297394 A JP 2837027 B JP 6003684 A KR 140970 B US 5402255 A	17-03-1999 12-11-1993 14-12-1998 14-01-1994 15-06-1998 28-03-1995
US 4836651	A	06-06-1989	DE 3840836 A FR 2624295 A JP 2000891 A	15-06-1989 09-06-1989 05-01-1990
EP 0443527	A	28-08-1991	JP 3241392 A DE 69109341 D DE 69109341 T KR 9404130 B US 5168384 A	28-10-1991 08-06-1995 31-08-1995 13-05-1994 01-12-1992
JP 01032231	A	02-02-1989	NONE	
US 4655551	A	07-04-1987	JP 1865580 C JP 3030152 B JP 60149079 A DE 3587443 A DE 3587443 T EP 0149458 A	26-08-1994 26-04-1991 06-08-1985 19-08-1993 27-01-1994 24-07-1985

## PCT REQUEST

PAT 99008\*PC

Original (for SUBMISSION) - printed on 09.06.2000 12:51:28 PM

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request Prepared using	PCT-EASY Version 2.90 (updated 08.03.2000)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	United Kingdom Patent Office (RO/GB)
0-7	Applicant's or agent's file reference	PAT 99008*PC
I	Title of invention	A DISPLAY MODULE
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	NOKIA MOBILE PHONES LIMITED
II-5	Address:	KEILALAHDENTIE 4 FIN-02150 ESPOO Finland
II-6	State of nationality	FI
II-7	State of residence	FI
II-8	Telephone No.	+358 24 3061
II-9	Facsimile No.	+358 24 3064 544
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	JOHNSON, Terence, Philip
III-1-5	Address:	19 Priors Keep Fleet, Hampshire GU13 9LB United Kingdom
III-1-6	State of nationality	GB
III-1-7	State of residence	GB

## PCT REQUEST

PAT 99008\*PC

Original (for SUBMISSION) - printed on 09.06.2000 12:51:28 PM

III-2	Applicant and/or inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	LEWIS, Ian, David
III-2-5	Address:	7 Spencer Close Church Crookham Fleet, Hampshire GU13 OEG United Kingdom
III-2-6	State of nationality	GB
III-2-7	State of residence	GB
IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name (LAST, First)	JEFFERY, Kendra
IV-1-2	Address:	NOKIA IPR DEPARTMENT Nokia House Summit Avenue Farnborough, Hampshire GU14 ONG United Kingdom
IV-1-3	Telephone No.	01252 865000
IV-1-4	Facsimile No.	01252 865080
IV-2	Additional agent(s)	additional agent(s) with same address as first named agent
IV-2-1	Name(s)	HIBBERT, Juliet; HAWS, Helen, Louise; HIGGIN, Paul; MUIR, Henry; FRAIN, Timothy
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW SD SL SZ TZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT



## PCT REQUEST

PAT 99008\*PC

Original (for SUBMISSION) - printed on 09.06.2000 12:51:28 PM

V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AG AL AM AT (patent and utility model) AU AZ BA BB BG BR BY CA CH&LI CN CR CU CZ (patent and utility model) DE (patent and utility model) DK (patent and utility model) DM DZ EE (patent and utility model) ES FI (patent and utility model) GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR (patent and utility model) KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK (patent and utility model) SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW	
V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.		
V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	10 June 1999 (10.06.1999)	
VI-1-2	Number	9913539.4	
VI-1-3	Country	GB	
VII-1	International Searching Authority Chosen	European Patent Office (EPO) (ISA/EP)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	11	-
VIII-3	Claims	2	-
VIII-4	Abstract	1	p99008pct.txt
VIII-5	Drawings	10	-
VIII-7	TOTAL	28	
VIII-8	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-12	Priority document(s)	Item(s) VI-1	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-18	Figure of the drawings which should accompany the abstract	2	
VIII-19	Language of filing of the International application	English	

## PCT REQUEST

PAT 99008\*PC

Original (for SUBMISSION) - printed on 09.06.2000 12:51:28 PM

IX-1	Signature of applicant or agent	
IX-1-1	Name (LAST, First)	JEFFERY, Kendra

## FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/EP
10-6	Transmittal of search copy delayed until search fee is paid	

## FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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# PATENT COOPERATION TREATY

From the

INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

To:

Jones, Kendra  
NOKIA IPR DEPARTMENT  
Nokia House  
Summit Avenue  
Farnborough, HANTS GU14 ONG  
GRANDE BRETAGNE

☐ Comp Record  
☐ File Record  
☐ Diary *JJA*

1 9 SEP 2001

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

17.09.2001

Applicant's or agent's file reference  
PAT 99008\*PC

**IMPORTANT NOTIFICATION**

International application No.  
PCT/GB00/02249

International filing date (day/month/year)  
09/06/2000

Priority date (day/month/year)  
10/06/1999

Applicant  
NOKIA MOBILE PHONES LIMITED

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.


#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office - P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

Authorized officer

Cardenas, C

Tel. +31 70 340-3370



## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PAT 99008*PC	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/02249	International filing date (day/month/year) 09/06/2000	Priority date (day/month/year) 10/06/1999
International Patent Classification (IPC) or national classification and IPC G02F1/13		
Applicant NOKIA MOBILE PHONES LIMITED		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  09/12/2000	Date of completion of this report  17.09.2001
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer  Diot, P  Telephone No. +31 70 340 3282  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/02249

**1. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, pages:**

1-11 as originally filed

**Claims, No.:**

1-18 as originally filed

**Drawings, sheets:**

1/10-10/10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/02249

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 15-18.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 15-18 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)

Yes: Claims 1-14

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02249

	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

- Claims 15-18 contains a reference to the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP 0369188

D2: US 4655551

D3: US 5897188

I. A. The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of claim 1-14 does not involve an inventive step in respect of the prior art as defined in the regulations [Rule 65(1) (2) PCT]:

The document D1, discloses (column 11, lines 36- 47) (the references in parentheses applying to this document):

A display module for a portable device, comprising:

a liquid crystal display (LCD 70) device comprising first and second liquid crystal cells (70a, 70b) positioned along a first axis of the display (see figure 6);  
first (PROC1) and second (PROC2) display drivers ( for respectively driving the first and second liquid crystal cells;



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB00/02249

D1 is silent about how the drivers are connected to the portable device.

The choice of a connector for connecting the LCD device circuitry to the portable device is an obvious necessity for the skilled person.

Remains the question of the connection of each drivers (PROC) (left and right screen drivers).

Claim 1 differs from this prior art in that the respective drivers are connected to the connector through an intermediate element (feature G).

B. The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

Feature G is described in document D2, (each driver (4) is carried by a flexible film (6) and is connected to an intermediate elongated member (14)) as providing the same advantages as in the present application (see D2, column 1, line 30- column 2, line 09). The skilled person would therefore regard it as a normal option to include this feature in the device of D1 in order to solve the same problem (reliable connection and easiness of mounting in a narrow space).

Thus, claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).

The same applies for dependent claims 2-7 and 9-14, because the subject-matter of these claims is straightforward.

Subject-matter of claim 8 is also considered as an obvious possibility from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed. Document D3 discloses an intermediate member PCB2 having thereon the power supply circuit (D3, column 20, lines 58-64).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB00/02249

**Re Item VII**

**Certain defects in the international application**

- The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2 and D3 is not mentioned in the description, nor are these documents identified therein.

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

**PCT**

To:  
NOKIA IPR DEPARTMENT  
Nokia House  
Attn. JEFFERY, Kendra  
Summit Avenue  
Farnborough  
Hampshire GU14 0NG  
UNITED KINGDOM

☒ Comp Record  
☒ File Record  
☐ Div  
☐ Renewal  
☒ Citations  
☐ Inv Award

29 AUG 2000

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing  
(day/month/year)

28/08/2000

Applicant's or agent's file reference

PAT 99008\*PC

**FOR FURTHER ACTION**

See paragraphs 1 and 4 below

International application No.

PCT/GB 00/ 02249

International filing date

(day/month/year)

09/06/2000

Applicant

NOKIA MOBILE PHONES LIMITED

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Marie-Françoise Provot

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

#### What documents must/may accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

## NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

**The following examples illustrate the manner in which amendments must be explained in the accompanying letter:**

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

### **"Statement under article 19(1)" (Rule 46.4)**

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

### **Consequence if a demand for international preliminary examination has already been filed**

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

### **Consequence with regard to translation of the international application for entry into the national phase**

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>PAT 99008*PC</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/ 02249</b>	International filing date (day/month/year) <b>09/06/2000</b>	(Earliest) Priority Date (day/month/year) <b>10/06/1999</b>
Applicant  <b>NOKIA MOBILE PHONES LIMITED</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

2



None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02249

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G02F1/13 H04M1/02 G06F3/147

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 841 431 A (SIMMERS CHARLES RUSSELL) 24 November 1998 (1998-11-24) column 4, line 40 - line 51; figure 2 ---	1,6-8, 11-14
Y	US 5 897 188 A (FUJITA MASARU ET AL) 27 April 1999 (1999-04-27) column 18, line 21 - line 50; figure 26 column 20, line 58 - column 21, line 32; figure 31 ---	1,6-8, 11-14
A	EP 0 369 188 A (TEXAS INSTRUMENTS INC) 23 May 1990 (1990-05-23) column 11, line 36 - line 58; figure 6 ---	1,12
A	EP 0 529 933 A (MOTOROLA INC) 3 March 1993 (1993-03-03) column 4, line 24 - line 34; figure 4 ---	1,12
	--- -/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

18 August 2000

Date of mailing of the international search report

28/08/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Diot, P

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02249

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 654 730 A (TANAKA KAZUO) 5 August 1997 (1997-08-05) column 4, line 18 -column 6, line 43; figure 1 ----	1-4, 11
A	EP 0 567 209 A (SHARP KK) 27 October 1993 (1993-10-27) column 4, line 43 -column 7, line 55; figure 9 ----	1-8
A	US 4 836 651 A (ANDERSON RICHARD A) 6 June 1989 (1989-06-06) column 1, line 20 -column 2, line 03; figure 1 ----	2
A	EP 0 443 527 A (CASIO COMPUTER CO LTD) 28 August 1991 (1991-08-28) column 4, line 10 -column 5, line 47; figure 3 ----	1,6,7
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 215 (P-874), 19 May 1989 (1989-05-19) & JP 01 032231 A (SEIKO EPSON CORP), 2 February 1989 (1989-02-02) abstract ----	1-8
A	US 4 655 551 A (WASHIZUKA ISAMU ET AL) 7 April 1987 (1987-04-07) column 2, line 603 -column 3, line 48; figures 1,10 -----	1-7



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02249

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5841431	A	24-11-1998	AU	3913497 A	03-06-1998
			CN	1246194 A	01-03-2000
			EP	1019896 A	19-07-2000
			WO	9821709 A	22-05-1998
US 5897188	A	27-04-1999	JP	5257142 A	08-10-1993
			US	5680183 A	21-10-1997
			US	5432626 A	11-07-1995
EP 0369188	A	23-05-1990	DE	68925271 D	08-02-1996
			DE	68925271 T	14-08-1996
			JP	2257731 A	18-10-1990
			US	5309351 A	03-05-1994
EP 0529933	A	03-03-1993	DE	69225446 D	18-06-1998
			DE	69225446 T	03-12-1998
			HK	1008156 A	30-04-1999
			JP	5232902 A	10-09-1993
			SG	46436 A	20-02-1998
US 5654730	A	05-08-1997	US	5841414 A	24-11-1998
EP 0567209	A	27-10-1993	JP	2870621 B	17-03-1999
			JP	5297394 A	12-11-1993
			JP	2837027 B	14-12-1998
			JP	6003684 A	14-01-1994
			KR	140970 B	15-06-1998
			US	5402255 A	28-03-1995
US 4836651	A	06-06-1989	DE	3840836 A	15-06-1989
			FR	2624295 A	09-06-1989
			JP	2000891 A	05-01-1990
EP 0443527	A	28-08-1991	JP	3241392 A	28-10-1991
			DE	69109341 D	08-06-1995
			DE	69109341 T	31-08-1995
			KR	9404130 B	13-05-1994
			US	5168384 A	01-12-1992
JP 01032231	A	02-02-1989	NONE		
US 4655551	A	07-04-1987	JP	1865580 C	26-08-1994
			JP	3030152 B	26-04-1991
			JP	60149079 A	06-08-1985
			DE	3587443 A	19-08-1993
			DE	3587443 T	27-01-1994
			EP	0149458 A	24-07-1985

PCT

REC'D 17 SEP 2001

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PAT 99008*PC		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/02249	International filing date (day/month/year) 09/06/2000	Priority date (day/month/year) 10/06/1999	
International Patent Classification (IPC) or national classification and IPC G02F1/13			
Applicant (NOKIA MOBILE PHONES LIMITED] JONES, Kendra			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 09/12/2000	Date of completion of this report 17.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Diot, P Telephone No. +31 70 340 3282 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02249

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, pages:**

1-11 as originally filed

**Claims, No.:**

1-18 as originally filed

**Drawings, sheets:**

1/10-10/10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/02249

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 15-18.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 15-18 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)

Yes: Claims 1-14

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/02249

	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

- Claims 15-18 contains a reference to the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP 0369188

D2: US 4655551

D3: US 5897188

I. A. The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of claim 1-14 does not involve an inventive step in respect of the prior art as defined in the regulations [Rule 65(1) (2) PCT]:

The document D1, discloses (column 11, lines 36- 47) (the references in parentheses applying to this document):

A display module for a portable device, comprising:

a liquid crystal display (LCD 70) device comprising first and second liquid crystal cells (70a, 70b) positioned along a first axis of the display (see figure 6);

first (PROC1) and second (PROC2) display drivers ( for respectively driving the first and second liquid crystal cells;

D1 is silent about how the drivers are connected to the portable device.

The choice of a connector for connecting the LCD device circuitry to the portable device is an obvious necessity for the skilled person.

Remains the question of the connection of each drivers (PROC) (left and right screen drivers).

Claim 1 differs from this prior art in that the respective drivers are connected to the connector through an intermediate element (feature G).

B. The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

Feature G is described in document D2, (each driver (4) is carried by a flexible film (6) and is connected to an intermediate elongated member (14)) as providing the same advantages as in the present application (see D2, column 1, line 30- column 2, line 09). The skilled person would therefore regard it as a normal option to include this feature in the device of D1 in order to solve the same problem (reliable connection and easiness of mounting in a narrow space).

Thus, claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).

The same applies for dependent claims 2-7 and 9-14, because the subject-matter of these claims is straightforward.

Subject-matter of claim 8 is also considered as an obvious possibility from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed. Document D3 discloses an intermediate member PCB2 having thereon the power supply circuit (D3, column 20, lines 58-64).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB00/02249

**Re Item VII**

**Certain defects in the international application**

- The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
  
- Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2 and D3 is not mentioned in the description, nor are these documents identified therein.



(19) World Intellectual Property Organization  
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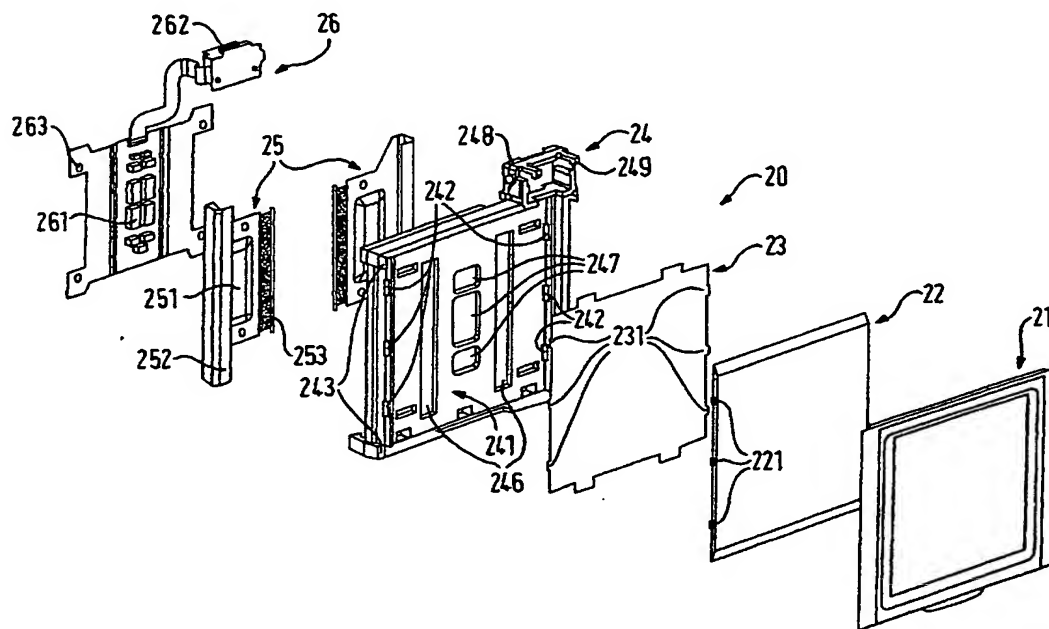
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(81) Designated States (national): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (utility model), KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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[Continued on next page]

(54) Title: A DISPLAY MODULE



(57) Abstract: A display module (20) is disclosed which may be employed in a portable device or the like. The module (20) comprises a liquid crystal display device comprising a liquid crystal display (21), and a display driver element (25) for driving the LCD. It also comprises a connector (262) for connecting LCD device circuitry to the portable device, and an intermediate element (26) for interfacing the LCD device and the connector.

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**Published:**

— *With international search report.*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

### A Display Module

The present invention relates to a display module. In particular, the invention relates to the configuration of a display module for a portable device.

Current display devices comprise a liquid crystal display (LCD) and a driver. Typically, the driver is mounted on a printed circuit board (PCB) of the portable device and connections are routed between the LCD and PCB. Figures 8(a) and (b) of the accompanying drawings illustrate display devices having single and x-y driver LCD displays respectively.

According to the present invention, there is provided a display module for a portable device, comprising a liquid crystal display device comprising a liquid crystal display (LCD), and a display driver element for driving the LCD, a connector for connecting LCD device circuitry to the portable device, and an intermediate element for interfacing the LCD device and the connector.

This configuration of display device, with an integrated driver, results in a reduction in the number of connections required for connection to the portable device, thus improving reliability and reducing the display space required. Moreover, it facilitates assembly and serviceability of the portable device as well as module reusability.

The intermediate element is preferably located substantially behind the LCD device, so as to further reduce the area of the display module. The area of the display may be yet further reduced by the provision of a display driver element comprising a flexible driver support. Such a support may be folded back from the LCD to contact an intermediate element positioned behind the LCD, for example.

Likewise, the intermediate element may be flexible, thereby enabling bending to contact the driver element (or support) and to bring the connector into contact with the portable device.

The flexible driver support and/or flexible intermediate element may be an flexible printed circuit (FPC) foil, thereby being lightweight and durable.

The intermediate element preferably comprises LCD power control circuitry. This leads to a further reduction in the number of connections required to be made to the portable device, and display space required in the portable device.

In an embodiment of the present invention, the LCD device of the display module comprises first and second driver elements comprising respective first and second drivers for driving the LCD. These first and second driver elements may be positioned on opposed sides of the LCD, in which case the intermediate element preferably interconnects the first and second driver elements. Further, the LCD may comprise first and second liquid crystal cells driven by the respective first and second driver elements.

This configuration of display device reduces the routing required between the drivers and cells compared with that shown in Figure 8(a), having a single liquid crystal cell of the same size. Consequently, the resolution is improved for that size of display. Likewise, the size of display is increased for a given resolution. This configuration also has a better contrast ratio over the single driver solution due to the lower multiplexer (MUX) rate. Moreover, the active area to glass ratio is improved since the number of conductive tracks which need to be routed to each driver is substantially reduced, compared to a single driver arrangement. Subsequently, having a reduced number of

conductive tracks further reduces the amount space around the edge of the glass plates used for routing the conductive tracks.

The present invention therefore enables a larger active area to be achieved on a LCD display device. Further, if the display drivers are positioned on opposing ends of LCD display device, the LCD advantageously has a symmetrical active area.

When the first and second display drivers are positioned at opposed sides of the LCD along the first axis of the display device, the device has a minimum width/height. For example, when the first axis extends in the direction of the height of the LCD (vertical configuration), the display device has a minimum width for a given size of LCD, whereas when the second axis extends in the direction of the width of the LCD (horizontal configuration), the display device has a minimum height for a given size of LCD.

The latter configuration is particularly useful for employment in radiotelephones and the like. Firstly, the minimum height enables the softkeys (function keys associated with items presented on the display) to be close to the display. Secondly, it facilitates the design of a phone that uses a slide to obtain the correct spacing between the microphone and earpiece.

Optionally, the LCD may be substantially symmetrical about a bisector. In this event, the liquid crystal cells are substantially aligned in one direction at least and preferably in both directions so that the device appears to be a unitary large display. Moreover, preferably the LCD and drivers are substantially symmetrical. This results in the usable area of the device being substantially symmetrical and no additional width/depth being required for the display to appear symmetrical in a device such as a radiotelephone. Accordingly, a device having such a configuration has a light weight to active area ratio.

According to another aspect, there is provided a portable device comprising a display module of the present invention.

According to a further aspect, there is provided a radio communications device comprising a display module of the present invention.

According to yet another aspect, there is provided a radio telephone comprising a display module of the present invention.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings of which:

Figure 1 is a block diagram of a display device according to an embodiment of the present invention;

Figure 2 is an exploded view of a display module according to an embodiment of the present invention;

Figure 3a is a perspective view from the front and rear of the display module of Figure 2;

Figure 3b shows various views of the display module of Figure 2;

Figure 4a is a perspective view from the front and rear of the LCD device interconnect;

Figure 4b shows various views of the LCD device interconnect;

Figure 5a illustrates the LCD device according to an embodiment of the present invention;

Figure 5b illustrates a tab of the LCD device of Figure 5a in more detail;

Figures 6a and 6b respectively illustrate horizontal and vertical configurations of the LCD device of different embodiments of the present invention;

Figure 7 illustrates a portable device comprising a display device of the present invention; and

Figures 8a and 8b illustrate conventional display devices, Figure 8a illustrating a device with a single display driver and Figure 8b illustrating a device with an x-y driver.

Figure 1 is a block diagram of a display device according to an embodiment of the present invention. The display device 10 comprises an LCD panel 11, two display drivers 14, 15 and an FPC unit 16. The LCD panel 11 is a "split" display. That is, it consists of two LCDs 12, 13 made up of individual cells sandwiched between common glass plates. The glass plates have a conductive coating, as is typical in LCD devices. The LCD 12 is driven by one of the display drivers, namely master display driver 14 and the LCD 13 is driven by the other display driver, slave driver 15. The master and slave drivers 14, 15 are synchronised and the two cells are abutted so that the two LCDs 12, 13 look like a single large display. The FPC unit 16 couples the master and slave display drivers and interfaces with external circuitry to obtain the necessary control and data signals and the like. The FPC unit may comprise the power supply control circuitry as will be explained further below with reference to Figures 2, 4a and 4b.

In this embodiment, serial interface signals (such as serial clock period (SCL), serial interface (SI), data/command indicator (AO), master and slave chip

select (master XCS, slave XCS) and reset timing signals) are received by the FPC unit 16 as the serial interface for the display device 10. These signals are forwarded to the display drivers 14, 15. The FPC device also receives the display device power supply (VDD, VSS). The drivers, in turn, output liquid crystal drive signals to drive the respective LCDs 12, 13.

In this example, the display drivers 14, 15 are Seiko Epson 1565 series dot matrix LCD drivers. These drivers have two main kinds of liquid crystal drive pins, SEG pins which are liquid crystal segment drive outputs and COM pins which are common drive outputs. Synchronisation of these devices when used in a master/slave configuration is handled internally by the driver devices.

As can be seen, in this embodiment the master and slave drivers are positioned on each side of the LCD panel 11. In this horizontal configuration, the routing of common drive outputs in the x-direction is reduced when compared, for example, with a single driver device such as that shown in Figure 8a. Consequently, a high resolution can be attained for large displays. In this case, the LCD panel 11 may have a pixel matrix of 111 x 106, pixel size of 0.19 x 0.22 mm and pixel pitch of 0.22 x 0.24 mm. Also, a reduced display height is also possible when compared, for example, with an x-y driver device of equivalent LCD panel size and resolution, such as that shown in Figure 8b. Furthermore, the device is substantially symmetrical, thus avoiding the need to compensate for any asymmetry when used in a device such as a portable device, as is the case with x-y driver devices. This, in turn, results in weight and volume savings.

As will be appreciated, Figure 1 is merely a block diagram, and the circuitry can be implemented in a number of ways. Two alternative configurations are illustrated in Figure 6.



Figure 2 is an exploded view of a display module 20 according to an embodiment of the present invention. The display module 20 comprises a liquid crystal display screen or panel 21, a lightguide 22, a reflector 23, a plastics support frame 24, two LCD tabs 25 and an FPC foil 26. Optionally, the module may also comprise a diffuser between the panel 21 and the lightguide 22. More detailed views of these components can be seen in Figures 3 to 5. The panel 21 is a split screen as in the Figure 1 embodiment, and likewise has two display drivers. These drivers are located on a respective tab 25, and are referenced 251 in Figure 2. The tabs 25 also each comprise a connector 252 comprising the driver pins etc. which connect to the LCD panel 21, and a connector 253 comprising pins for connecting to the serial interface and for coupling the two drivers 251. The driver connector 252 comprises of the order of 182 pins, and the FPC foil connector 23 comprises of the order of 28 pins. The FPC foil comprises power control circuitry 261 and a board to board connector 262. This board to board connector 262 is a 10 contact connector, of which 9 contacts are used as the serial interface to the display. This connector may plug into a corresponding connector on a PCB of the device in which the display module is to be used.

The number of contacts required to the PCB of the device is minimal due in part to the fact that the drivers are positioned on the tabs 25 of the module 20, (as opposed to the conventional position of on a PCB of the device), and in part due to the fact that the power control circuitry 261 is positioned on the FPC foil 26 of the module. (For example, this module uses only 9 external contacts, compared with in excess of 150 for a conventional single driver device). On an assembly line, the reduction in the number of contacts required provides significant advantages, since smaller connectors are quicker to assemble, cheaper, smaller, lighter and more reliable than connectors having a large number of contacts.

These components are assembled to form a module as shown in Figure 3a. The tabs 25 are fixedly attached to the display panel 21 to form an LCD tab assembly, as is illustrated in Figure 5a. This attachment may, for instance, be by bonding. The support frame 24 is designed with a recess 241 on its front face for receiving the reflector 23, lightguide 22, diffuser (if desired), and display panel 21. It also comprises a number of notches 242 that correspond to respective tabs 221, 231 on the lightguide 22 and reflector 23 for location purposes.

Once the reflector 23 and lightguide 22 are located within the recess of the support frame, the LCD tab assembly is coupled to the support frame 24. In this embodiment, the support frame 24 comprises a flexible lug 243 on each corner for providing a push fit connection of the LCD panel to the support frame 24.

Subsequently, the FPC foil 26 is positioned on the rear of the support frame 24. The rear face of the support frame 24 is recessed to a depth slightly greater than the joint thickness of the tabs 25 and FPC foil 26. It also has orifices 246 for receiving the drivers 251 and orifices 247 for receiving the power control circuitry etc. Four protrusions 245 on the rear of the support frame serve to locate the main body of the FPC foil 26 by extending into corresponding holes 264 on the foil. The protrusions and holes are arranged so that the connectors 263 of the FPC foil 26 lie over the apertures 246 of the support frame. This assists in the connection of these connectors 263 with those 253 of the tabs 25, as is explained below. A neck 265 of the FPC foil is passed from the rear to the front of the support frame 24 so as to position the connector 262 in front of a connector support 248 portion of the support frame 24. The neck 265 is passed through a cable strap of the connector support 248, which keeps the neck 265 near the side of the connector support. The support 248 also comprises connector support flexible lugs 249 for providing

a push fit connection of the connector 262 to the connector support 248. The connector 262 can then be pushed into the connector support to make a push fit connection.

The next assembly step is to connect the connectors 253 of the tabs 25 to corresponding connectors 263 of the FPC foil 26. The tabs 25 have folds 254 corresponding to the side edges of the frame, so that they may be wrapped tightly around the support frame 24. They also comprise holes 263 that correspond to the protrusions 245 on the rear of the support frame so as to locate the tab connectors 253 over those 263 of the FPC foil 26. As mentioned above, the connectors are located over the apertures 246 to assist in connection of the connectors. In this embodiment, prior to locating the tabs, a silicon rubber insulator is positioned in the apertures 246 behind the FPC foil connectors 263. The tabs are then located and the FPC foil and tab connectors 253, 263 are heat bonded together (by heating and applying pressure). The insulator is then removed from the module 20. Alternatively, of course, the insulator could be inserted prior to location of the FPC foil or after location of both the FPC foil 26 and the tabs 25.

Figure 3b shows different views of the display module of Figure 2, namely, front, rear, top, bottom and left side views. It also illustrates a pixel array. As mentioned above, in this embodiment, the dimensions shown may have a pixel size (a x d) of 0.19 x 0.22 mm and pixel pitch (b x e) of 0.22 x 0.24 mm. Consequently, in this case there is a horizontal pixel gap c of 0.3 mm and a vertical pixel gap f of 0.2 mm. The LCD cells can be abutted such that only a 0.3mm gap is apparent where they abut which is not noticeable by the human eye.

Figures 4a and 4b illustrate the FPC foil 26 in more detail. The connectors 263, components and tracking 261 may be applied to the foil using any of the known techniques.

Figure 5a shows front, left side and two bottom views of the LCD tab assembly comprising the tabs 25 and the display panel 21. One bottom view shows the assembly flat, and the other with the tabs folded along the folds 254. Figure 5b shows the tabs 25 in more detail. Preferably, the tabs 25 are made of FPC foil and again the connectors, drivers and tracking are applied to the foil using any of the known techniques.

Figure 6 illustrates two different configurations of a display device with a "split screen", Figure 6a showing a display module 61 with a horizontal configuration, and Figure 6b showing a display module 69 with a vertical configuration. Each display module comprises an LCD panel 62 consisting of two LCDs 65, 66, and two display drivers 67, 68. The LCD 65 is driven by display driver 61, and the LCD 66 is driven by display driver 68. The drivers 67, 68 are synchronised and the cells of LCDs 65, 66 are abutted so that the two LCDs look like a single large display. As in the figure 2 embodiment, the drivers are on tabs 63, 64 and fold under the module to reduce the modules area. The tabs and or a separate element comprise the driver coupling and module interface. Both configurations enable the provision of a small compact module with minimum area and weight to display content. The area of the module is compact and the glass area to active area ratio is excellent. The horizontal configuration provides a minimum product height, whereas the vertical configuration provides a minimum product width.

A radiotelephone 70 comprising a display device 71 of the invention is illustrated in Figure 7. This radiotelephone has all the usual components of a radiotelephone, including an earpiece 74 and microphone 75. In this

embodiment, the phone has a slide to extend the gap between the earpiece 74 and microphone 75 to that between a user's ear and mouth when the phone is to be used for conversation. This radiotelephone further comprises function keys 72. These keys are softkeys, that is, their function alters depending upon the item presented on the display 71. Preferably, the display device 71 in this radiotelephone 70 has the horizontal configuration of Figure 6b as its minimum height enables the softkeys (function keys associated with items presented on the display) to be positioned close to the display. Secondly, it facilitates the design of an well proportioned slide phone.

The present invention may be embodied in other specific forms without departing from its essential attributes. Accordingly reference should be made to the appended claims and other general statement's herein rather than to the foregoing specific description as indicating the scope of invention.

Furthermore, each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features. In this regard, the invention includes any novel features or combination of features disclosed herein either explicitly or any generalisation thereof irrespective of whether or not it relates to the claimed invention or mitigates any or all of the problems addressed.

The appended abstract as filed herewith is included in the specification by reference.

**Claims**

1. A display module for a portable device, comprising:  
a liquid crystal display (LCD) device comprising first and second liquid crystal cells positioned along a first axis of the display;  
first and second display drivers for respectively driving the first and second liquid crystal cells;a connector for connecting LCD device circuitry to the portable device; and  
an intermediate element for interfacing the display drivers and the connector.
2. A display module as claimed in claim 1, wherein the intermediate element is positioned substantially behind the LCD device.
3. A display module as claimed in any preceding claim, wherein the display drivers comprise a flexible driver support.
4. A display module as claimed in claim 3, wherein the flexible driver support flexes to contact the LCD and the intermediate element.
5. A display module as claimed in claim 3 or 4, wherein the flexible driver support is a flexible printed circuit (FPC) foil.
6. A display module as claimed in any preceding claim, wherein the intermediate element is flexible.
7. A display module as claimed in claim 6, wherein the intermediate element is an FPC foil.

8. A display module as claimed in any preceding claim, wherein the intermediate element comprises LCD device power control circuitry.

9. A display module as claimed in any previous claim, wherein the first and second display drivers are on opposed sides of the LCD.

10. A display module as claimed in any previous claim, wherein the display drivers are positioned along the first axis.

11. A display module as claimed in any previous claim, wherein the intermediate element interconnects the first and second display drivers.

12. A portable device comprising a display module as claimed in any preceding claim.

13. A radio communications device comprising a display module as claimed in any of claims 1 to 11.

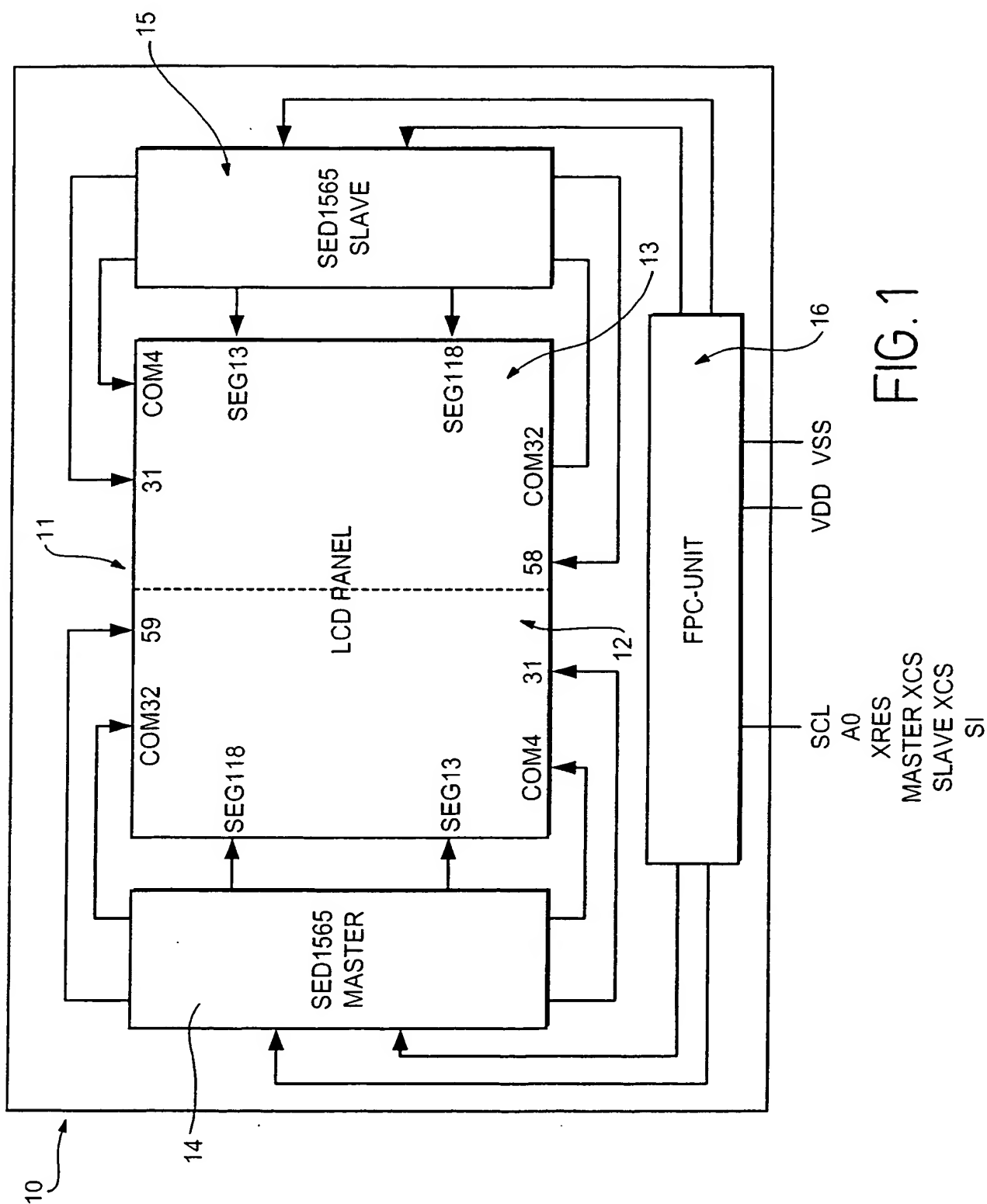
14. A radiotelephone comprising a display module as claimed in any of claims 1 to 11.

15. A display module substantially as hereinbefore described with reference to and/or as illustrated in any one, or any combination of, Figures 1 to 6 of the accompanying drawings.

17. A portable device comprising a display module substantially as hereinbefore described with reference to and/or as illustrated in any one, or any combination of, Figures 1 to 6 of the accompanying drawings.

18. A radio communications device comprising a display module substantially as hereinbefore described with reference to and/or as illustrated in any one, or any combination of, Figures 1 to 6 of the accompanying drawings, with or without reference to Figure 7.





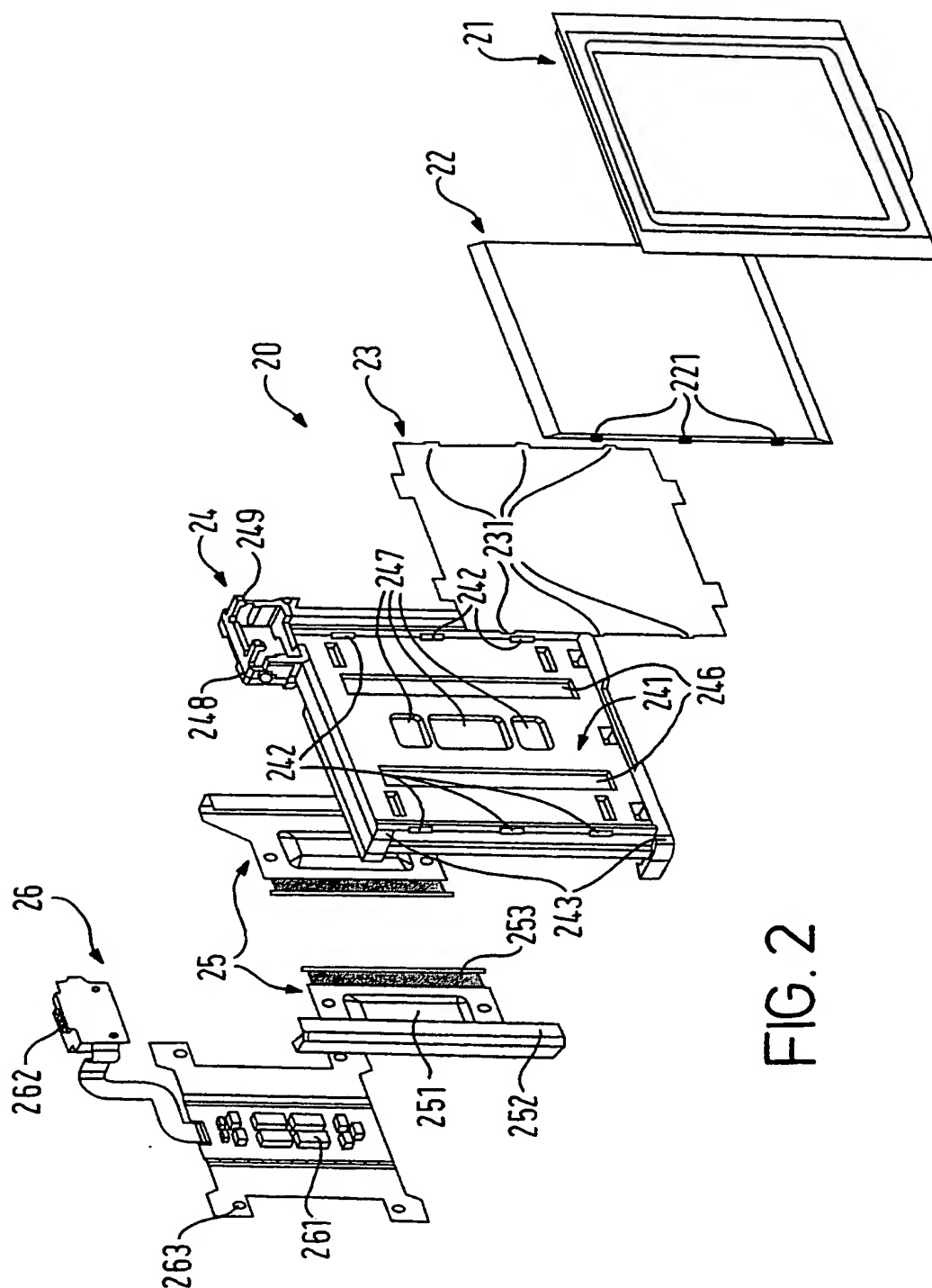
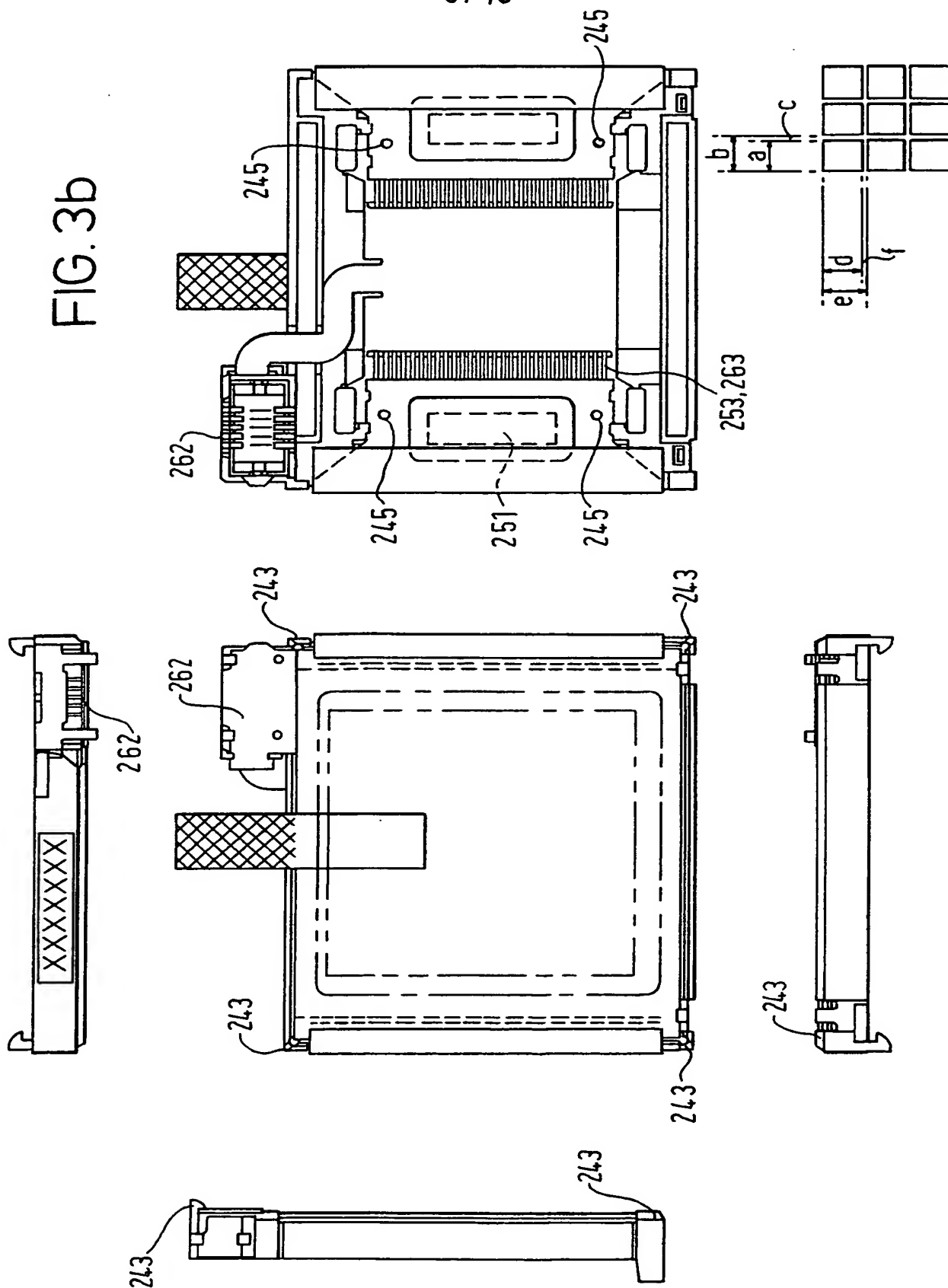
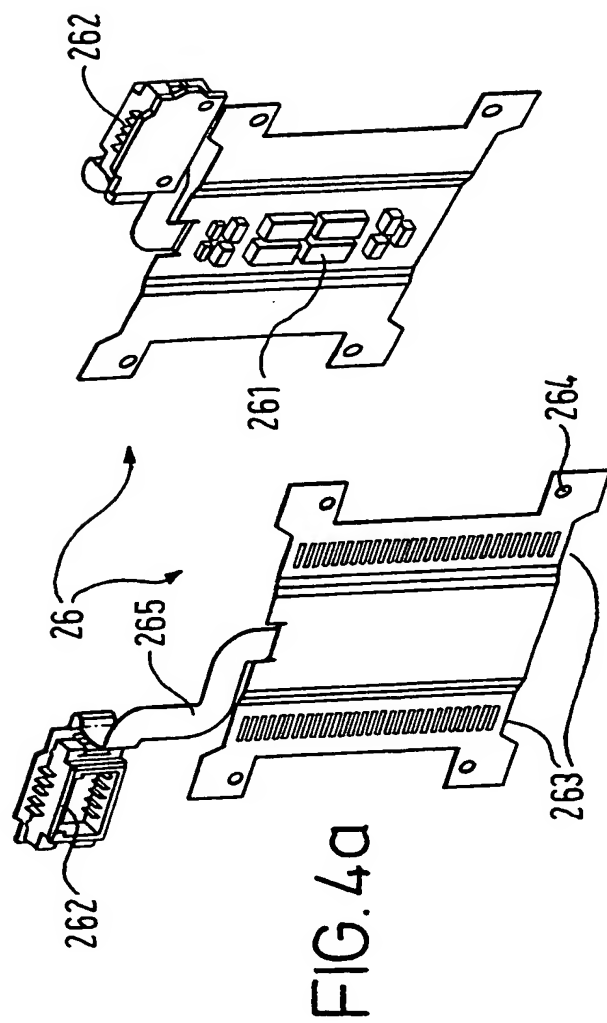
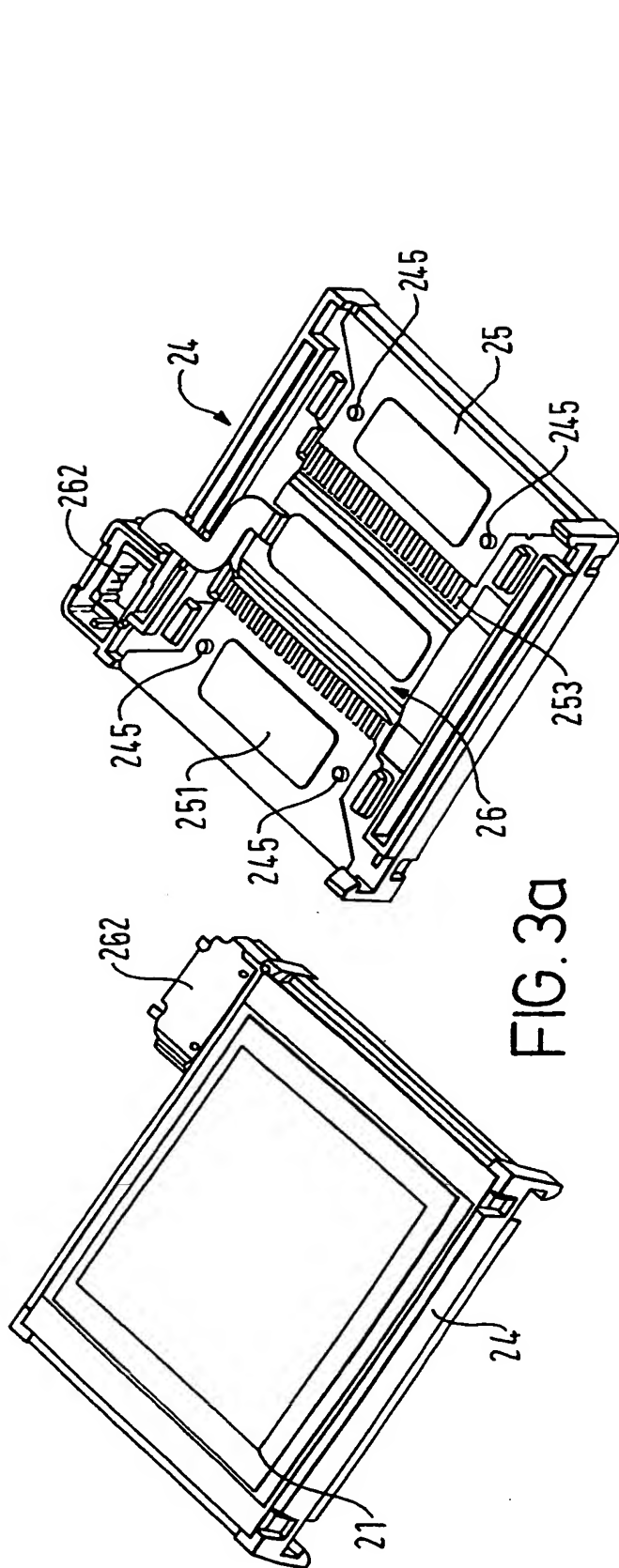


FIG. 2

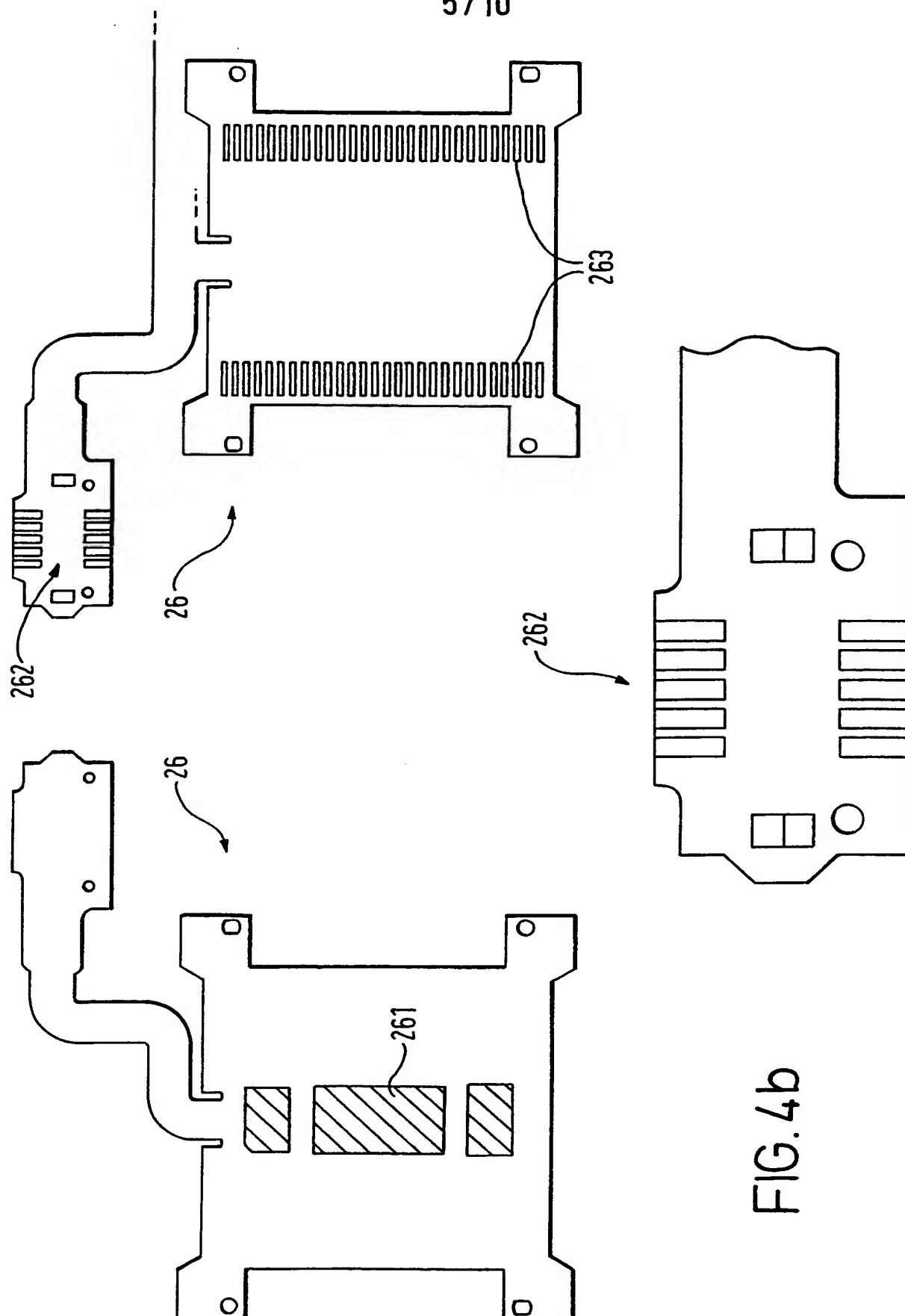
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FIG. 3b

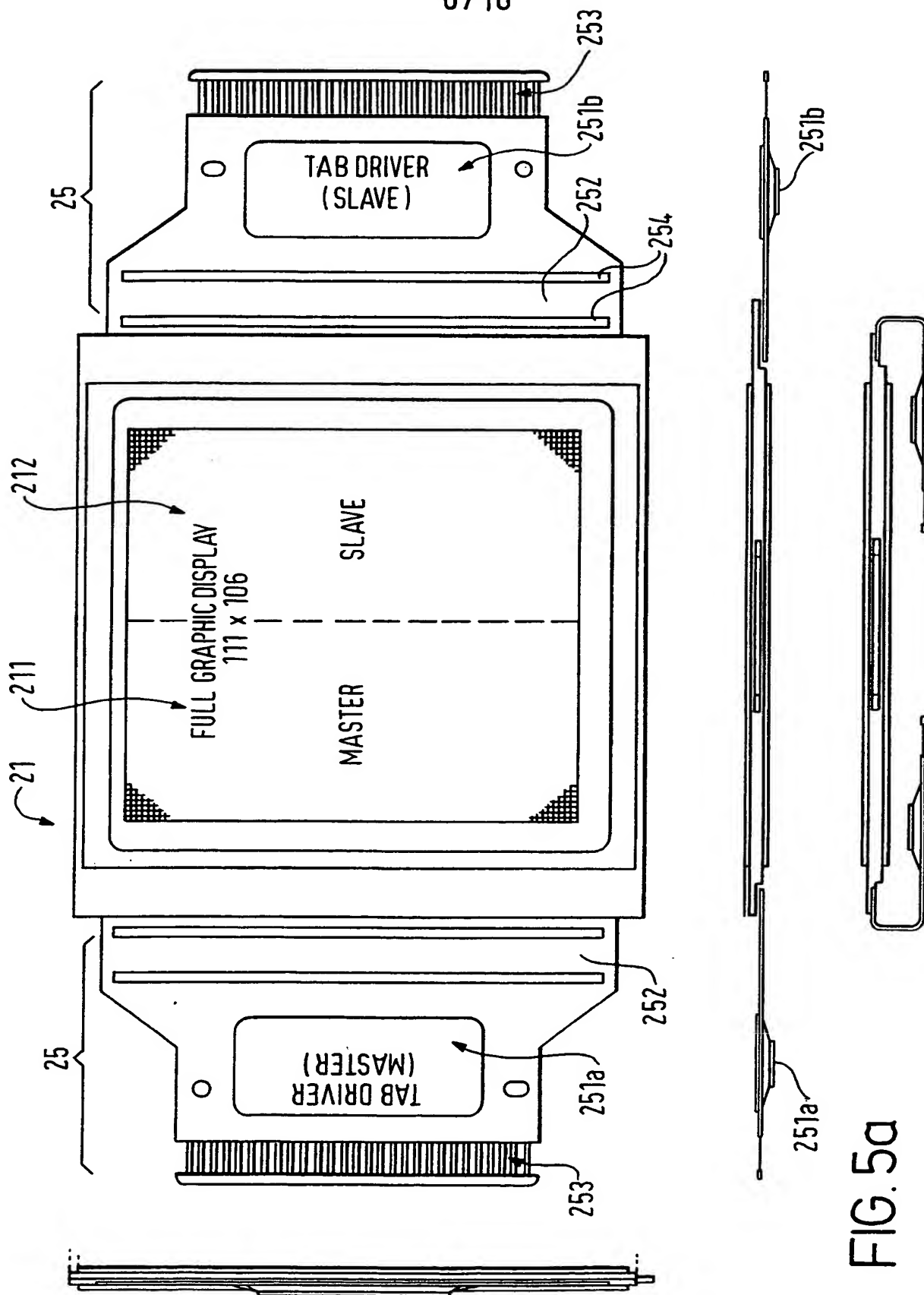




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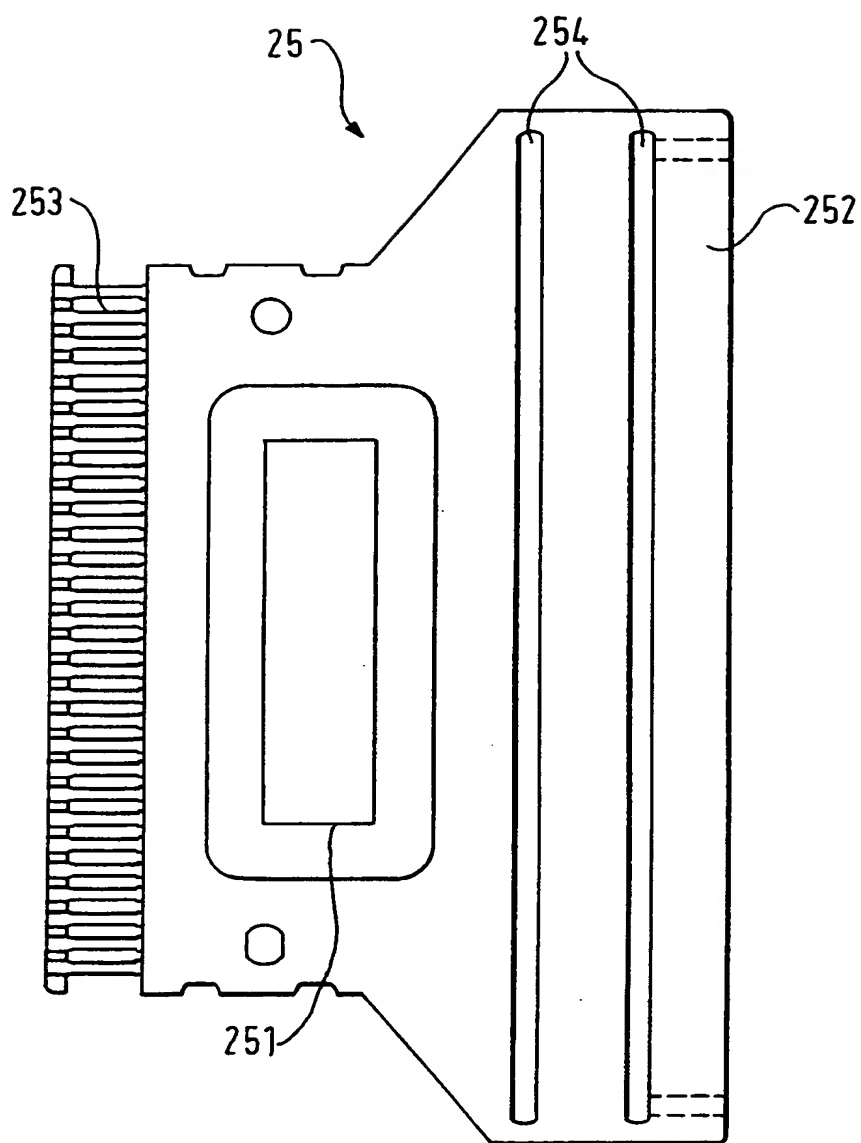


FIG. 5b

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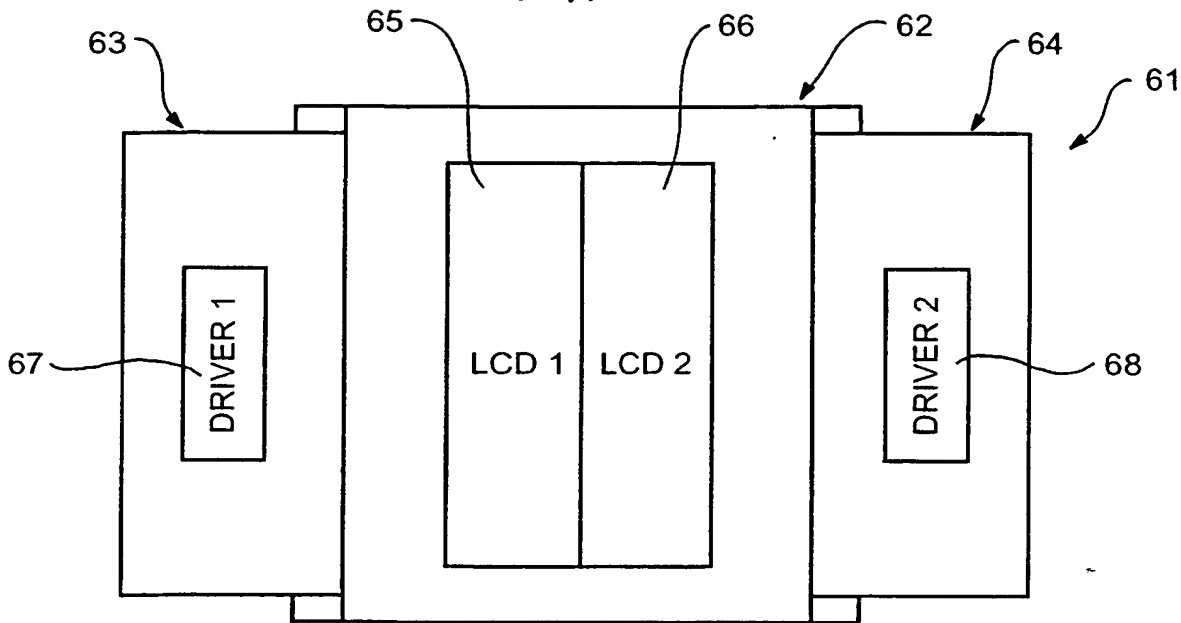


FIG. 6a

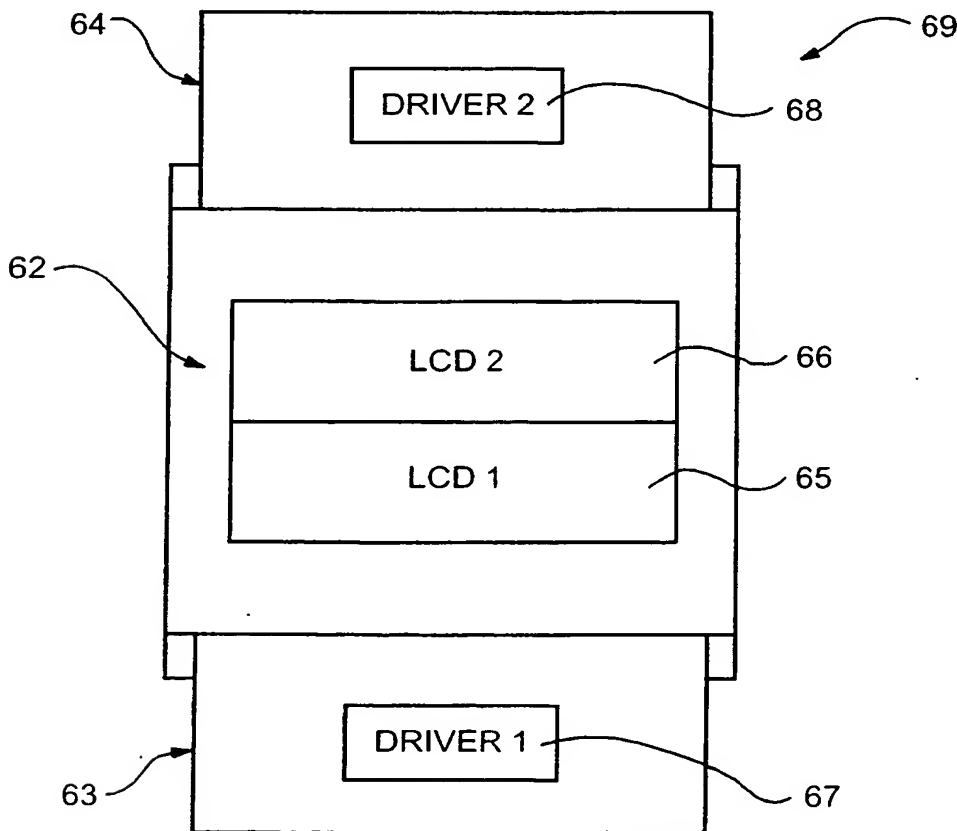
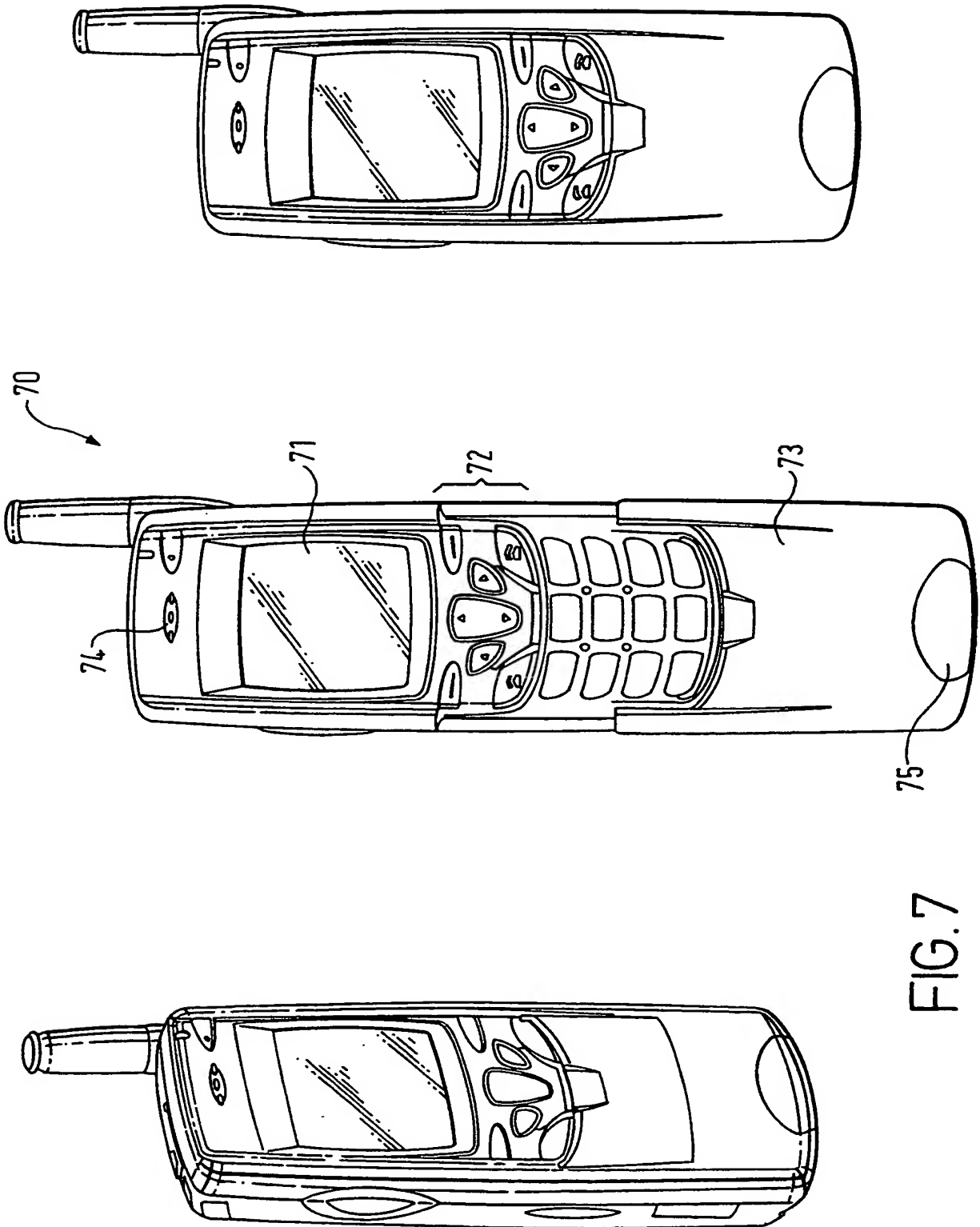


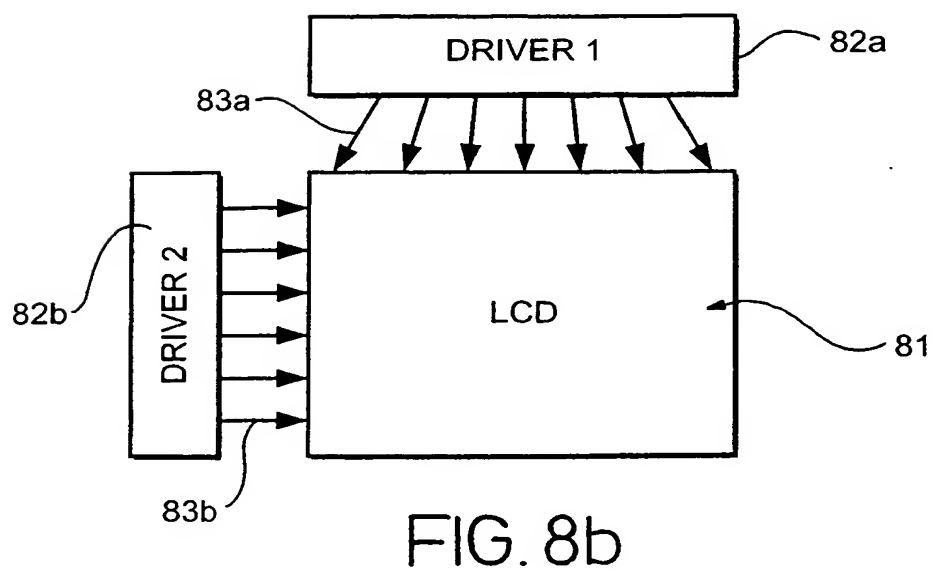
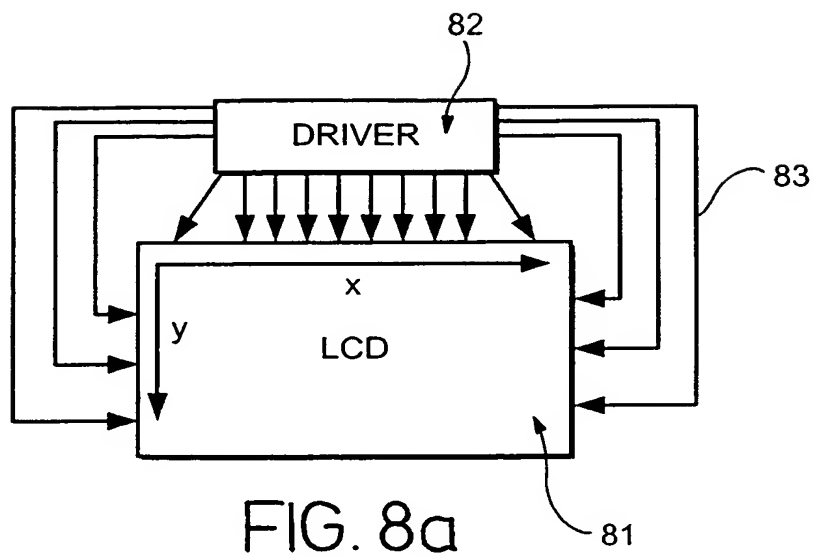
FIG. 6b



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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02249

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G02F1/13 H04M1/02 G06F3/147

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 841 431 A (SIMMERS CHARLES RUSSELL) 24 November 1998 (1998-11-24) column 4, line 40 - line 51; figure 2	1,6-8, 11-14
Y	US 5 897 188 A (FUJITA MASARU ET AL) 27 April 1999 (1999-04-27) column 18, line 21 - line 50; figure 26 column 20, line 58 - column 21, line 32; figure 31	1,6-8, 11-14
A	EP 0 369 188 A (TEXAS INSTRUMENTS INC) 23 May 1990 (1990-05-23) column 11, line 36 - line 58; figure 6	1,12
A	EP 0 529 933 A (MOTOROLA INC) 3 March 1993 (1993-03-03) column 4, line 24 - line 34; figure 4	1,12
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

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Date of the actual completion of the international search

18 August 2000

Date of mailing of the international search report

28/08/2000

Name and mailing address of the ISA

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Diot, P

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02249

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 654 730 A (TANAKA KAZUO) 5 August 1997 (1997-08-05) column 4, line 18 -column 6, line 43; figure 1 ----	1-4, 11
A	EP 0 567 209 A (SHARP KK) 27 October 1993 (1993-10-27) column 4, line 43 -column 7, line 55; figure 9 ----	1-8
A	US 4 836 651 A (ANDERSON RICHARD A) 6 June 1989 (1989-06-06) column 1, line 20 -column 2, line 03; figure 1 ----	2
A	EP 0 443 527 A (CASIO COMPUTER CO LTD) 28 August 1991 (1991-08-28) column 4, line 10 -column 5, line 47; figure 3 ----	1,6,7
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 215 (P-874), 19 May 1989 (1989-05-19) & JP 01 032231 A (SEIKO EPSON CORP), 2 February 1989 (1989-02-02) abstract ----	1-8
A	US 4 655 551 A (WASHIZUKA ISAMU ET AL) 7 April 1987 (1987-04-07) column 2, line 603 -column 3, line 48; figures 1,10 -----	1-7

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02249

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5841431 A	24-11-1998	AU 3913497 A CN 1246194 A EP 1019896 A WO 9821709 A	03-06-1998 01-03-2000 19-07-2000 22-05-1998
US 5897188 A	27-04-1999	JP 5257142 A US 5680183 A US 5432626 A	08-10-1993 21-10-1997 11-07-1995
EP 0369188 A	23-05-1990	DE 68925271 D DE 68925271 T JP 2257731 A US 5309351 A	08-02-1996 14-08-1996 18-10-1990 03-05-1994
EP 0529933 A	03-03-1993	DE 69225446 D DE 69225446 T HK 1008156 A JP 5232902 A SG 46436 A	18-06-1998 03-12-1998 30-04-1999 10-09-1993 20-02-1998
US 5654730 A	05-08-1997	US 5841414 A	24-11-1998
EP 0567209 A	27-10-1993	JP 2870621 B JP 5297394 A JP 2837027 B JP 6003684 A KR 140970 B US 5402255 A	17-03-1999 12-11-1993 14-12-1998 14-01-1994 15-06-1998 28-03-1995
US 4836651 A	06-06-1989	DE 3840836 A FR 2624295 A JP 2000891 A	15-06-1989 09-06-1989 05-01-1990
EP 0443527 A	28-08-1991	JP 3241392 A DE 69109341 D DE 69109341 T KR 9404130 B US 5168384 A	28-10-1991 08-06-1995 31-08-1995 13-05-1994 01-12-1992
JP 01032231 A	02-02-1989	NONE	
US 4655551 A	07-04-1987	JP 1865580 C JP 3030152 B JP 60149079 A DE 3587443 A DE 3587443 T EP 0149458 A	26-08-1994 26-04-1991 06-08-1985 19-08-1993 27-01-1994 24-07-1985

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